KOOTENAI DEVELOPMENT IMPOUNDMENT DAM

February 7th, 200X ROUTINE INSPECTION REPORT

BILLMAYER & HAFFERMAN ENGINEERING INC.

February 23, 2008

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EXECUTIVE SUMMARY

A late winter 2008 site inspection and routine monitoring site visit was made Friday February 7th, 2008. Projects completed included;

1. Obtain Piezometer reading for piezometer A8
2. Observe and photograph toe drains
3. Read V-notch weirs below the drain outlets.
4. Read staff gauge in the drain outlet channel.
5. Estimate flow in the outlet channel.

On the day of the inspection the snow depth at the dam site was over 3 ft. deep. Access to the dam had to be made using snowmobiles and was both strenuous and potentially perilous. The temperature was approximately 15 °F and there was a slight wind out of the northwest.

Many of the piezometers were either buried in the snow or in an area of the dam that was not accessible due to the deep snow. Therefore the decision was made to focus on the toe drains and the main piezometer that has is the most active; piezometer A8. The reading in piezometer A8 was 8.55 ft. below the top of the piezometer casing. The reading in A8 in December 2007 was 8.52 ft. These readings are normal.

The staff gauge in the stream below the drains was recorded at 0.80 ft. Using the FlowMaster™ rating table the total flow from the drains was recorded at 0.31 cfs (139 gpm). The flow was up slightly from the December reading. The December 2007 staff gauge reading was 0.78 ft. and the flow was recorded at 0.28 cfs (126 gpm). It was speculated that this is a reaction to late fall rains in the area of the project just now routing through the dam.

All of the drains were flowing at the normal flow rate and no anomalies were found in the drain flow. A photograph of the outside of each drain was made. It was noted that the wet areas below drains 7 and 8 was slightly wider than normal.

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INTRODUCTION

The Kootenai Development Impoundment Dam is an earthen tailings impoundment dam located in the NW ¼ of Section 22 in Township 31 North, Range 30 West in Lincoln County, Montana. The dam is located at the confluence of Rainy Creek and Fleetwood Creek, which are tributary to the Kootenai River.

On Thursday February 7th, 2008 a routine monitoring was completed on the project. Those in attendance were Kurt Hafferman from Billmayer & Hafferman Engineering, and Jeff Robertson from Chapman Construction.

The Kootenai Development Impoundment Dam is located on a US EPA Superfund site and access to the dam is restricted. The on site hazard is asbestos. All personnel involved in this inspection are 40-Hour HAZWOPER trained, are medically monitored, are medically certified to wear respirators, and have all been fit tested for appropriate respirators.

The purpose of the project was to complete routine planned maintenance and develop a plan and schedule for completing the future maintenance.

HAZARDOUS WASTE AND EMERGENCY OPERATIONS (HAZWOPER) PLAN

The HAZWOPER Project manager and Field Leader for this site inspection was Kurt Hafferman. The decontamination supervisor and field assistant and the Health and Safety Officer was Jeff Robertson. Site security was provided by the US EPA at the entrance to the project. The Personal Protective Equipment (PPE) used was North Full Face® respirators with P-100 filters (purple), double layer Tyvek® suits with Tyvek® booties, cotton glove liners with rubber outer gloves and rubber over booties.

SITE INSPECTION RESULTS

As the normal inspection was not conducted, the Periodic Inspection Report was not filled out. A copy of the field inspection notes are enclosed in Exhibit 1 to this report. The following report will provide details to the field notes and will comprise the body of the February 7th, 2008 Routine Inspection Report.

Reservoir

The reservoir was not inspected due to heavy snow and lack of secure access.

Piezometers

Only piezometer A8 was monitored due to heavy snow and lack of secure access to the other piezometers. The reading was found to be 8.55 ft. below the top of casing. The reading in December was 8.52 ft. so there is a slight drop in this reading.

Concrete Box Culvert

The box culvert was not inspected due to heavy snow and lack of secure access.

Open Concrete Chute Spillway

The open chute concrete spillway was not inspected due to heavy snow and lack of secure access.

Dam Crest

The crest of the dam was not inspected due to heavy snow and lack of secure access.

Upstream Face

The upstream face of the dam was not inspected due to heavy snow and lack of secure access.

Downstream Face

The downstream face was not inspected due to heavy snow and lack of secure access.

Toe Drains

The following toe drains were located and checked. There is no difference since the December 26th, 2007 inspection. Photographs were made and are shown below or included in Exhibit 2.

Drains 1: A 12-inch corrugated metal pipe in the left groin. The drain was dry. The drain was covered with snow on the day of the inspection so a photograph was not available.

Drain 2: A 12-inch corrugated metal pipe in the left groin. The drain had a small amount of water and was moist inside. The drain was covered with snow and a photograph was not practical.

Drain 3: Drain 3 is an 8-inch concrete pipe near the left groin. The drain was running water. The drain was covered with snow and a photograph was not practical.

Drain 4: An 8-inch concrete pipe, with the bell end sticking out, in the left side, approximately 50 feet from left groin. The drain was flowing water and the flow was clear. The flow amount was typical for this drain. A photograph on the day of the inspection is shown in Figure 1 below;

Figure 1: Drain 4

Weir 1,2,3,4:

The weir below drains 1,2,3,and 4 was checked and the reading was found to be ½ inch which corresponds to a flow of 12.6 gpm. This is the same reading as the December 26th inspection. A photograph of the weir is shown in Figure 2 below;

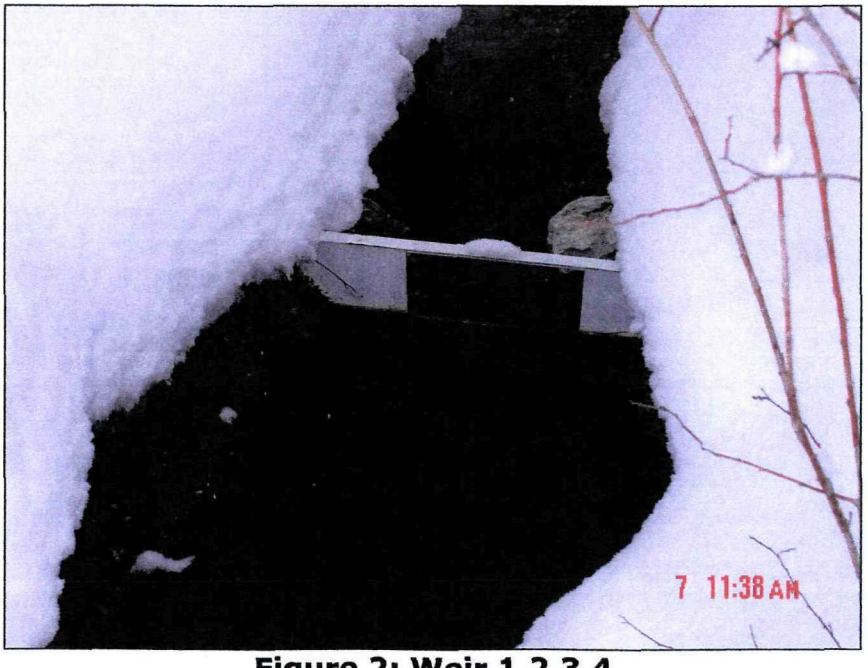


Figure 2: Weir 1,2,3,4

Drain 5: Is a corrugated metal pipe near the center of the dam. The drain had a small amount of flow. The amount of flow is typical for this drain. The V-notch weir below this drain was noted as being 1-1/8th inch which is a flow of 3.33 gpm. The

flow in the December 26th inspection was 2.35 gpm so the flow was slightly increased. A photograph of this drain is shown in Figure 3 below;

Figure 3: Drain 5

Drain 6: Is the large steel pipe in the center of the embankment. The flow was normal. The water depth was noted as being 11-5/8 inches down from the top inside. The December 26th measurement was 11-5/8 so this drain flow has not changed. A photograph of the drain is shown in Figure 4 below;

Figure 4: Drain 6

Drain 7 and Drain 8: Drains 7 and 8 are located together on the right side of the center of the embankment. Drain 7 is on top of Drain 8. Drain 7 is typically dry and was dry at this time. Drain 8 is an old CMP that is half buried in the silts. Drain 8 had a small amount of flow. It was noted that the area around this drain appeared slightly larger than had been previously observed. It may have been that it appeared larger because of the heavy snow around the other drains. This area will continue to be monitored. Drain 7 was covered with snow and a photograph was not practical. The area around Drain 8 is shown in Figure 5 below.

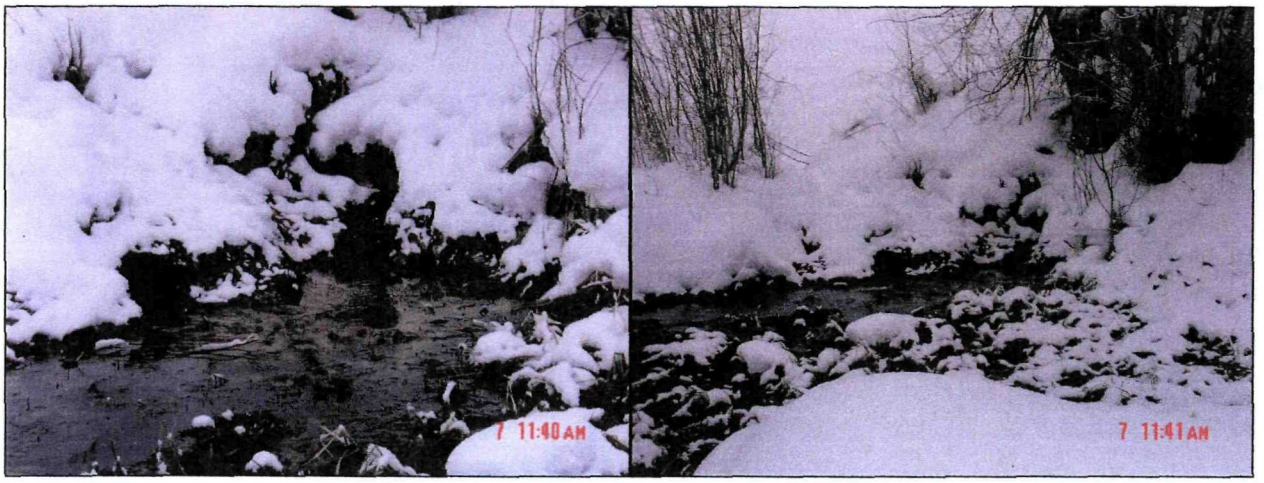


Figure 5: Area around Drain 8

Drain 9 and Drain 10: Drains 9 and 10 are a pair of drains located approximately 100 ft. left of the right groin. Drain 9 is a CMP and Drain 10 is a concrete pipe drain. There was water flowing from both drains which is typical of these drains. The flow is clear. Photographs of the drains are shown in Figure 6 below.

Figure 6: Drain 9 and Drain 10

Drain 11: Drain 11 is an 8-inch concrete pipe. The drain was flowing water as is typical of this drain. The flow was clear and was a normal amount. A photograph of the drain is shown in Figure 7 below:

Figure 7: Drain 11

Drain 12 was covered with snow and a photograph was not practical. The V-notch weir below the drain was read and the reading was 1-3/4 inches which corresponds to a flow of 9.43 gpm. The flow in December was also 9.43 gpm. The stream channel below Drain 11 and Drain 12 had the normal amount of water flow below the drains. The channel is shown in Figure 8 below.

Figure 8: Stream Channel below Drain 11 and Drain 12

Main Channel: The staff gauge reading was taken. The staff gauge read 0.80 ft. After the November 9th, 2007 inspection the flow measurement data that had been taken the three previous inspections was used to develop a rating table for the staff gauge using FlowMaster®. A copy of the rating table is included in Exhibit 3 to this report. The rating table estimates a staff gauge reading is equal to a flow rate of 0.31 cfs (139 gpm). The flow at the December 26th inspection was 0.28 cfs (126 gpm). The flow has increased 13 gpm since the December reading. A photograph of the stream gauge is shown in Figure 9 below.

Figure 9: Stream Gauge

Downstream Toe

The area downstream could not be observed because of the heavy snow cover but showed no obvious signs of unusual seepage, no signs of bulges or displaced material and no other concerns or anomalies that were noted.

DISCUSSION

A. Emergency Action Plan: The Emergency Action Plan is current.

B. Operational Plan: The operational plan is up to date and needs no changes at this time.

C. Crest: There was no observation of the crest

D. Upstream face: There were no observations of the upstream crest.

E. Piezometers: As discussed above, only piezometer A8 could be accessed. There was a slight drop in piezometer A8 from the December reading.

F. Earthen Channel and Trash Rack above the Concrete Box Culvert: The trash rack was not inspected.

G. Concrete Box Culvert: The box culvert was not inspected.

H. Concrete Chute Spillway: The spillway was not inspected

I. Downstream Face: The downstream face was covered in snow and was not inspected. No changes or anomalies were observed.

J. Toe Drains: A total of twelve (12) toe drains were checked. The drains that are flowing water are normal and the flow is clear. No changes or anomalies were noted.

K. Monitoring: Only the monitoring of piezometer A8, the drains and the staff gauge were accomplished. There were no significant changes or anomalies noted. The stream flow below the drain has increased 13 gpm since the December 26th reading.

CONCLUSIONS AND RECOMMENDATIONS

It is the conclusion of Billmayer Engineering that the overall condition of the Kootenai Development Impoundment Dam remains good to very good.

The blockage and debris in the drains continues to be investigated and repair, cleaning or replacement alternatives are being considered.

DAM SAFETY COMPLIANCE

Billmayer & Hafferman Engineering continue to perform the monthly monitoring, with assistance from one employee from Chapman Construction.

There are no issues or deadlines that will concern the Montana Dam Safety program. Preparation for the 5-year operational permit renewal inspection is still on track and the operational permit inspection is planned for early fall of 2008.

EXHIBITS

EXHIBIT 1

FIELD NOTES

Katrina Impeachment Day

Thurs. Feb. 1, 2007

R56.1

On site at 12:30
Cold, ptly cloudy 3:15 =
Heavy snow cover

Access by snowmobile

Haffern & Robertson

No access to dam
due to heavy snow

AB – 8.65 btc.

28.3 bottom

D1 – covered
D2 – flowing covered in snow
D3 – flowing covered
D4 – flowing photo
D5 flowing
D6 – flowing – 1 5/8"

D7-D8 – appears wider below
D8! May just be snow

- Well probe
- Camera
- Field Book

Weir 1234 – 1/2"

V-notch D5 – 1 1/8"

D9-D10 Flowing, clear
no chng

D11- Flowing clear

D12- covered in snow

D12 V-notch 1 3/4"

GH- 0.80 - 0.83
higher than Dec.

No other observation
Nothing unusual

out at 1:30

EXHIBIT 2

PHOTOGRAPHS


7 11:46 AM


7 11:36 AM


7 11:37 AM


7 11:46 AM


7 11:33 AM


7 11:37 AM


7 11:44 AM


5
4
3
2
1
1.0
9
7 11:51 AM

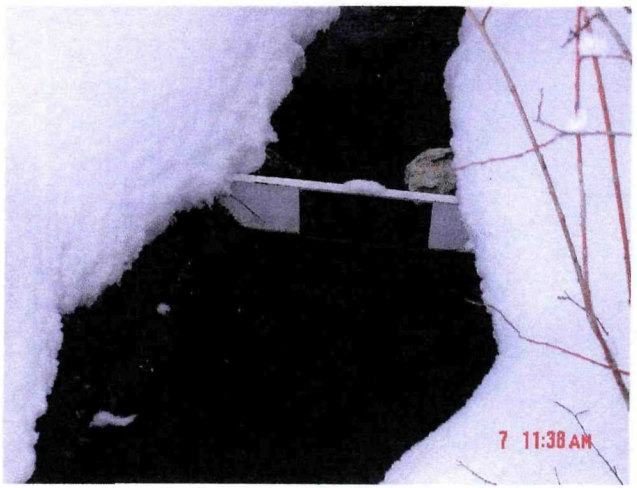

7 11:37 AM


7 11:40 AM


7 11:41 AM


7 11:39 AM


7 11:41 AM


7 11:38 AM


7 11:40 AM


7 11:41 AM


11:42 AM

EXHIBIT 3

FLOWMASTER RATING TABLE

Stream Gauge for Toe Drains at the Kootenai Impoundment Dam
Rating Table for Irregular Channel

Project Description	
Project File	\\server1\users\document\job files\jobs\r\r_56_01\documents\stream g.fm2
Worksheet	Stream Gauge Below Drains
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Channel Slope	0.000491 ft/ft

Input Data			
	Minimum	Maximum	Increment
Water Surface Elevation	0.43	1.00	0.01 ft

Rating Table

Water Surface Elevation (ft)	Wtd. Mannings Coefficient	Discharge (cfs)
0.43	0.036	0.00
0.44	0.038	0.35e-4
0.45	0.037	0.34e-3
0.46	0.037	0.97e-3
0.47	0.038	0.17e-2
0.48	0.037	0.34e-2
0.49	0.037	0.01
0.50	0.037	0.01
0.51	0.037	0.01
0.52	0.036	0.02
0.53	0.036	0.02
0.54	0.037	0.02
0.55	0.037	0.03
0.56	0.037	0.04
0.57	0.037	0.04
0.58	0.037	0.05
0.59	0.037	0.06
0.60	0.037	0.06
0.61	0.037	0.07
0.62	0.037	0.08
0.63	0.037	0.09
0.64	0.037	0.10
0.65	0.037	0.11
0.66	0.037	0.12
0.67	0.037	0.13
0.68	0.037	0.14
0.69	0.037	0.15

Stream Gauge for Toe Drains at the Kootenai Impoundment Dam
Rating Table for Irregular Channel

Rating Table			
Water Surface Elevation (ft)	Wtd. Mannings Coefficient	Discharge (cfs)	
0.70	0.037	0.16	
0.71	0.037	0.18	
0.72	0.037	0.19	
0.73	0.037	0.20	
0.74	0.037	0.22	
0.75	0.037	0.23	
0.76	0.037	0.25	
0.77	0.036	0.26	
0.78	0.036	0.28	
0.79	0.036	0.30	
0.80	0.037	0.31	139 gpm
0.81	0.036	0.33	
0.82	0.036	0.35	
0.83	0.036	0.37	166 gpm
0.84	0.037	0.38	
0.85	0.036	0.41	
0.86	0.037	0.42	
0.87	0.035	0.45	
0.88	0.037	0.46	
0.89	0.035	0.50	
0.90	0.037	0.50	
0.91	0.035	0.54	
0.92	0.035	0.57	
0.93	0.036	0.57	
0.94	0.036	0.59	
0.95	0.036	0.61	
0.96	0.036	0.64	
0.97	0.036	0.66	
0.98	0.036	0.69	
0.99	0.036	0.71	
1.00	0.036	0.74	